AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph beginning at **page 29, line 18** and insert the following rewritten paragraph:

Two landing sensors 24 and 25 are provided on the bottom face of the foot 14 of the each leg 2 (more specifically, the bottom face of a shoe put on the foot 14). Among the landing sensors 24 and 25, the landing sensor 24 is disposed in a place (heel) just under the ankle joint 13 and the landing sensor ~~24~~ 25 is disposed in a place (toe) just under the metatarsophalangeal joint 14a of the foot 14 (a joint at the root of the big toe of the foot 14). These landing sensors 24, 25 are sensors outputting ON/OFF signals indicating whether the parts where they are disposed are in contact with the ground. Incidentally, detected outputs from the joint displacement sensors 21, 22, 23 and the landing sensors 24, 25 are input to the arithmetic processing unit 18 of the sensor box 15 via signal lines (not shown).

Please replace the paragraph beginning at **page 30, line 6** and insert the following rewritten paragraph:

As shown in Fig. 1, two optical fibers 26, 27 are extended upward from the sensor box 15 along the back face of the body 3 and their points are fixed to the back face of the abdomen 7 and the back face of the chest 8, respectively, via a belt or other member not shown. The optical fibers 26, 27 are components of detection means for detecting tilt angles (tilt angles on a sagittal plane) of the abdomen 7 and the chest 8, respectively, relative to the waist 6. The tilt angles of the abdomen 7 and the chest 8 are measured by using the optical fibers 26, 27 in the method

described below. The method of measuring the tilt angle of the abdomen 7 using the optical fiber 26 will now be typically described. A light having a predetermined intensity is introduced from the light emitter/receiver 19 (shown in Fig. 2) disposed in the sensor box 5 into the optical fiber 26 and the introduced light is reflected at the end of the optical fiber 26 and returns to the sensor box 15 side. The light emitter/receiver 19 then detects the feedback amount of the light (the intensity of the feedback light). The optical fiber 26 is provided with a plurality of notches (not shown) allowing subtle light leakage disposed at intervals in the longitudinal direction. Therefore, light of the amount according to the tilt angle of the abdomen 7 relative to the waist 6 leaks from the optical fiber 26 via the notches, out of the light introduced into the optical fiber 26. Therefore, the feedback amount of the light to the sensor box 15 side depends upon the tilt angle of the abdomen 7 and the tilt angle of the abdomen 7 relative to the waist 6 is measured by detecting the feedback amount. In other words, the detected outputs of the light emitter/receiver 19 according to the feedback amount of the light of the optical fiber ~~25~~ 26 depends upon the tilt angle of the abdomen 7 relative to the waist 6 and it is input to the arithmetic processing unit 18 as a signal indicating the tilt angle. The same applies to the method of measuring the tilt angle of the chest 8 using the optical fiber 27.

Please replace the paragraph beginning at **page 34, line 19** and insert the following rewritten paragraph:

In this instance, the thigh element S10 and the crus element S12 are each extending in the direction of a line segment connecting the centers of the joint elements between the joint elements at the both ends of each of them. Moreover,

the foot element S14 has a tip that corresponds to a metatarsophalangeal joint 14a ~~(hereinafter, referred to as the MP joint 14a)~~ of the foot 14 of the human being 1 and is extending from the ankle joint 13 (J13) to the metatarsophalangeal joint 14a (hereinafter, referred to as the MP joint 14a) of the foot 14 as shown in Fig. 1. In the rigid link model S1, the tip of the foot element S14 does not have a function of a joint, but hereinafter the tip is referred to as the MP joint J14a for convenience in some cases.

Please replace the paragraph beginning at **page 42, line 6** and insert the following rewritten paragraph:

Moreover, the arithmetic processing unit 18 includes total/element center-of-gravity motion calculation means 32 for calculating a value of the position vector of the total center-of-gravity (the total center-of-gravity of the human being 1) of the rigid link model S1 in the body coordinate system BC by using the values of the position vectors of the centers of gravity of the rigid elements calculated by the joint and element center-of-gravity location calculation means 29 and for calculating a value (a coordinate component value in the body coordinate system BC) of the acceleration vector (translational acceleration) of the total center-of-gravity by using the time-series data of the value of the position vector and the value of the acceleration vector of the origin of the body coordinate system BC calculated by the body coordinate system acceleration calculation means 30. The total/element center-of-gravity motion calculation means ~~30~~ 32 also calculates values (coordinate component values in the body coordinate system BC) of the acceleration vectors (translational accelerations) of the centers of gravity of the thigh element S10, the

crus element S12, and the foot element S14 by using the time-series data of the values of the position vectors of the centers of gravity of the thigh element S10, the crus element S12, and the foot element S12 calculated by the joint and element center-of-gravity location calculation means 29 and the value of the acceleration vector of the origin of the body coordinate system BC calculated by the body coordinate system acceleration calculation means 30.

Please replace the paragraph beginning at **page 44, line 9** and insert the following rewritten paragraph:

Moreover, the arithmetic processing unit 18 includes joint moment estimation means 35 for estimating joint moments acting on the ankle joint 13, the knee joint 11, and the hip joint 9 of the each leg 2 by using the transformation tensor generated by the transformation tensor generation means 28, the acceleration vectors of the centers of gravity of the thigh element S10, the crus element S12, and the foot element S14 calculated by the total/element center-of-gravity motion calculation means ~~3032~~3032, the value of the floor reaction force vector estimated by the floor reaction force estimation means 33, and the value of the position vector of the floor reaction force acting point estimated by the floor reaction force acting point estimation means 34.

Please replace the paragraph beginning at **page 61, line 26** and insert the following rewritten paragraph:

Subsequently, the arithmetic processing unit 18 performs the arithmetic processing of the total/element center-of-gravity motion calculation means ~~3032~~3032. In

the arithmetic processing of the total/element center-of-gravity motion calculation means ~~30~~32, first, a position vector U(G_total/BC) in the body coordinate system BC of the total center-of-gravity of the rigid link model S1 (the total center-of-gravity of the human being 1, hereinafter referred to as G_total in some cases) is found by the following formula (14), from the centers of gravity location of the rigid elements (the position vectors in the body coordinate system BC) found by the joint and element center-of-gravity location calculation means 29 and the weights of the rigid elements preset as described above:

U(G_total/BC)

= {U(G_chest/BC} × m_chest

+ U(G_abdomen/BC) × m_abdomen

+ U(G_waist/BC) × m_waist

+ U(G_right thigh/BC) × m_right thigh

+ U(G_left thigh/BC) × m_left thigh

+ U(G_right crus/BC) × m_right crus

+ U(G_left crus/BC) × m_left crus

+ U(G_right foot/BC) × m_right foot

+ U(G_left foot/BC) × left foot}/total weight

... ... (14)

Please replace the paragraph beginning at **page 63, line 8** and insert the following rewritten paragraph:

In the arithmetic processing of the total/element center-of-gravity motion calculation means ~~30~~32, a second derivative U(G_total/BC)" of U(G_total/BC) is

calculated from the time-series data (the time-series value of U(G_total/BC) for each arithmetic processing period of the arithmetic processing unit 18) of the position vector U(G_total/BC) of the total center-of-gravity calculated as described above. The second derivative U(G_total/BC)" denotes a relative acceleration of the total center-of-gravity G_total to the origin BCO of the body coordinate system BC. Then, the second derivative U(G_total/BC)", namely, the relative acceleration of G_total to the origin BCO of the body coordinate system BC is added to the acceleration vector ACC(BCO/BC) of the origin BCO of the body coordinate system BC previously found by the body coordinate system acceleration calculation means 30, by which an actual acceleration vector ACC(G_total/BC) of G_total is calculated. In other words, ACC(G_total/BC) is calculated by the following formula (15):

$$ACC(G\_total/BC) = ACC(BCO/BC) + U(G\_total/BC)'' \quad \ldots\ldots (15)$$